

PSG 020030
PCT/1803/04647

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Date of Filing : 08 NOV 2002

REC'D 18 NOV 2003

WIPO PCT

Application Number : PCT/SG02/00301 [withdrawn]

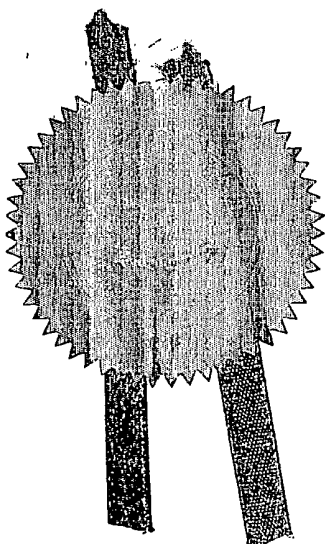
Applicant(s) /
Proprietor(s) of Patent : PHILIPS ELECTRONICS SINGAPORE PTE
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Title of Invention : A HIGH-FREQUENCY DEVICE


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0	For receiving Office use only	
0-1	International Application No.	PCT/SG 02 / 00301
0-2	International Filing Date	03 NOV 2002 (08-11-02)
0-3	Name of receiving Office and "PCT International Application"	REGISTRY OF PATENTS (SINGAPORE) PCT INTERNATIONAL APPLICATION
0-4	Form - PCT/RO/101 PCT Request	
0-4-1	Prepared using	PCT-EASY Version 2.92 (updated 01.10.2002)
0-5	Petition The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty	
0-6	Receiving Office (specified by the applicant)	Intellectual Property Office of Singapore (RO/SG)
0-7	Applicant's or agent's file reference	PSG020030WOP
I	Title of invention	A HIGH-FREQUENCY DEVICE
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III-1-11	Applicant's registration No. with the Office	GPA 02/0007
V	Designation of States	
V-1	Regional Patent (other kinds of protection or treatment, if any, are specified between parentheses after the designation(s) concerned)	EP: AT BE CH&LI CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE TR and any other State which is a Contracting State of the European Patent Convention and of the PCT (except BG CZ EE SK)
V-2	National Patent (other kinds of protection or treatment, if any, are specified between parentheses after the designation(s) concerned)	SG
V-5	Precautionary Designation Statement In addition to the designations made under Items V-1, V-2 and V-3, the applicant also makes under Rule 4.9(b) all designations which would be permitted under the PCT except any designation(s) of the State(s) indicated under Item V-6 below. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit.	
V-6	Exclusion(s) from precautionary designations	NONE
VI	Priority claim	NONE
VII-1	International Searching Authority Chosen	European Patent Office (EPO) (ISA/EP)

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VIII	Declarations	Number of declarations	
VIII-1	Declaration as to the identity of the Inventor	-	
VIII-2	Declaration as to the applicant's entitlement, as at the international filing date, to apply for and be granted a patent	-	
VIII-3	Declaration as to the applicant's entitlement, as at the international filing date, to claim the priority of the earlier application	-	
VIII-4	Declaration of inventorship (only for the purposes of the designation of the United States of America)	-	
VIII-5	Declaration as to non-prejudicial disclosures or exceptions to lack of novelty	-	
IX	Check list	number of sheets	electronic file(s) attached
IX-1	Request (including declaration sheets)	4	-
IX-2	Description	3	-
IX-3	Claims	1	-
IX-4	Abstract	1	EZABST00.TXT
IX-5	Drawings	3	-
IX-7	TOTAL	12	
	Accompanying Items	paper document(s) attached	electronic file(s) attached
IX-8	Fee calculation sheet	✓	-
IX-11	Copy of general power of attorney	reference no.	-
IX-17	PCT-EASY diskette	-	Diskette
IX-19	Figure of the drawings which should accompany the abstract	1	
IX-20	Language of filing of the international application	English	
X	Signature of applicant, agent or common representative		
X-1	Name (LAST, First)	SMIT, Frederik, J.	
X-2	Capacity	Authorized Representative	

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10-1	Date of actual receipt of the purported international application	08 NOV 2002 (087102)
10-2	Drawings:	
10-2-1	Received	
10-2-2	Not received	
10-3	Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application	
10-4	Date of timely receipt of the required corrections under PCT Article 11(2)	
10-5	International Searching Authority	ISA/EP

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10-6	Transmittal of search copy delayed until search fee is paid	
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11-1	Date of receipt of the record copy by the International Bureau	
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A high-frequency device

The invention relates to a device, particularly a high-frequency device, comprising a frame provided with walls and leg sections extending from said walls, said device furthermore comprises a printed circuit board extending perpendicular to said walls, whereby said leg sections extend through holes in said printed circuit board through holes in
5 the printed circuit board and connected to the printed circuit board by solder.

In an embodiment of such a device, which is known from the British patent application GB-A-2,318,690, a metal frame is provided with outer side walls as well as inner
10 walls extending between the outer side walls. The inner walls of the metal frame are provided with leg sections extending through holes in the printed circuit board and connected thereto by means of solder. Due to the leg sections, the printed circuit board is grounded. If such a device is used as analog or digital receiver, it is important that the printed circuit board is surrounded by said frame as much as possible. Furthermore, it is important to ground the
15 printed circuit board also on the side edges.

By the known device it is not possible to ground the printed circuit board on the side edges other than by connecting the side edges directly to the outer side walls. This has the disadvantages that due to thermal expansion coefficient differences between the printed circuit board and the metal frame the connection between the printed circuit board
20 and the frame will crack.

It is an object of the invention to provide a device, particularly a high frequency device, wherein also an outer side wall is grounded in a reliable and easy manner.

25 This object is being achieved by the device according to the invention in that at least one outer side wall of said frame is provided with at least one leg section which extends through a hole located in part of said printed circuit board, which part extends through said outer side wall.

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In this way the whole printed circuit board except for said part provided with said hole, can be surrounded by the frame, whilst simultaneously the printed circuit board is grounded by means of said part and the leg section of said outer side wall of said frame, which is located in hole in said part.

5 Because the part of said printed circuit board extends through said outer side wall, the outer dimensions of the frame can remain the same as by prior art devices. This has the advantage that the device can comply with international standards to the dimensions of such devices like receivers.

10 An embodiment of the device according to the invention is characterized in that said outer side wall is provided with at least one cut out part, in which said leg section is located and through which the part of the printed circuit board extends.

Such outer side wall can easily be made by punching whereby a piece of said outer side wall is cut out to form the cut out part whilst forming simultaneously the leg section.

15 An other embodiment of the device according to the invention is characterized in that all outer side walls are provided with leg sections extending through holes located in parts of the printed circuit board, which extend through said outer side walls.

In this way optimal grounding of the device can be achieved.

20

The invention will be explained by way of example in more detail hereafter with reference to the drawings in which:

Fig. 1 is an exploded view of a device according to the invention,

25 Fig. 2 is an exploded view of a frame and a printed circuit board of the device as shown in Fig. 1,

Fig. 3 is an perspective view of the device as shown in Fig. 1,

Fig. 4 is an exploded view of another frame of a device according to the invention.

Like parts are indicated by the same numerals.

30

Fig. 1 shows an exploded view of a high-frequency (hf) device 1 according to the invention, comprising a metal frame 2, a printed circuit board 3, a connector 4, a pin block 5 connected both to said printed circuit board 3 and extending through said frame 2,

and two covers 6, 7 extending parallel to said printed circuit board 3 and closing the metal frame 2 from below and above as seen in Fig. 1.

5 The metal frame 2 is provided with four outer side walls 8, 9, 10, 11 between which inner walls 12 extend. The inner walls 12 comprise leg sections 13 which cooperate with holes 14 in the printed circuit board 3. The outer side walls 8-11 are provided with cut out parts 15 from which U-shaped parts are cut out. In this way leg sections 16 are formed on the outer side walls 8-11. The leg sections 13 extending from the inner walls 12 as well as the leg sections 16 in the outer side walls 8-11 are located on a same level with respect to the edges 17 of the outer side walls 8-11. The printed circuit board 3 is provided with parts 18
10 extending from the printed circuit board 3 in a direction parallel to the printed circuit board 3. In said parts 18 holes 19 are located which are aligned with the leg sections 16 of said frame 2.

By assembling of the device 1 the frame 2 is connected to the printed circuit board 3 whereby the leg sections 13, 16 are inserted through the holes 14, 19 respectively.
15 Edges 20 of the inner walls 12 are then resting on the printed circuit board 3, whilst the outer side walls 8-11 surround the printed circuit board 3 and extend along edges 21 of the printed circuit board 3. The parts 18 are located in the cut out parts 15, whereby the parts 18 have a width W nearly as large as the width of the cut out parts 15. The length L of the parts 18 is preferably as small as possible but such that the parts 18 do extend through the outer side
20 walls 8-11 and that holes 19 can be provided therein for insertion of the leg sections 16. After the leg sections 13, 16 are inserted through the holes 14, 19 respectively, the leg sections 13, 19 are connected to the printed circuit board 3 by means of soldering to provide grounding means for the printed circuit board 3.

By means of the leg sections 13 extending from the inner walls 12 and the leg
25 sections 16 located in the outer side walls 8-11 an easy and reliable method is provided for connection as well as grounding the printed circuit board 3 to the frame 2.

Fig. 4 shows a frame 2' which is similar to the frame 2 except that it comprises an additional inner wall 22, which shields unwanted oscillator to the IF output.

CLAIMS:

1. A device comprising a frame provided with walls and leg sections extending from said walls, said device furthermore comprises a printed circuit board extending perpendicular to said walls, whereby said leg sections extend through holes in said printed circuit board through holes in the printed circuit board and connected to the printed circuit
5 board by solder, characterized in that, at least one outer side wall of said frame is provided with at least one leg section which extends through a hole located in part of said printed circuit board, which part extends through said outer side wall.
2. A high-frequency device according to claim 1, characterized in that said outer
10 side wall is provided with at least one cut out part, in which said leg section is located and through which the part of the printed circuit board extends.
3. A high-frequency device according to claim 1 or 2, characterized in that all
15 outer side walls are provided with leg sections extending through holes located in parts of the printed circuit board, which extend through said outer side walls.

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ABSTRACT:

A high-frequency device comprises a frame (2) provided with walls (12; 9-11) and leg sections (13; 16) extending from said walls. Said device furthermore comprises a printed circuit board (3) extending perpendicular to said walls, whereby said leg sections extend through holes (14; 19) in said printed circuit board through holes in the printed circuit board and connected to the printed circuit board by solder. At least one outer side wall of said frame is provided with at least one leg section which extends through a hole located in part of said printed circuit board, which part extends through said outer side wall.

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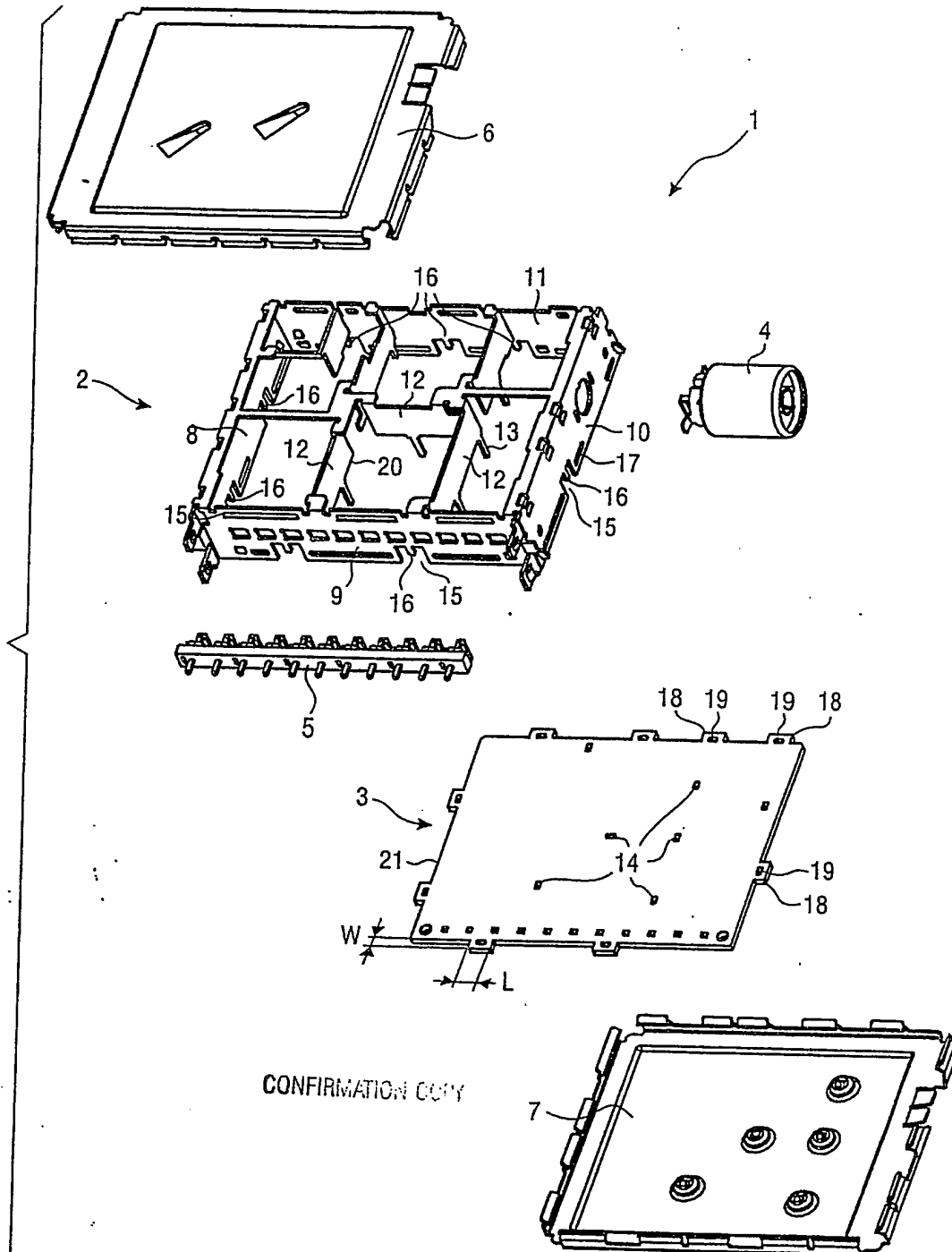
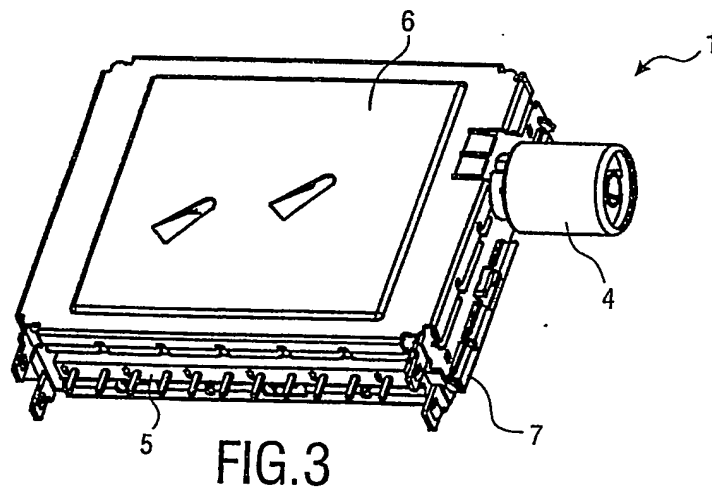
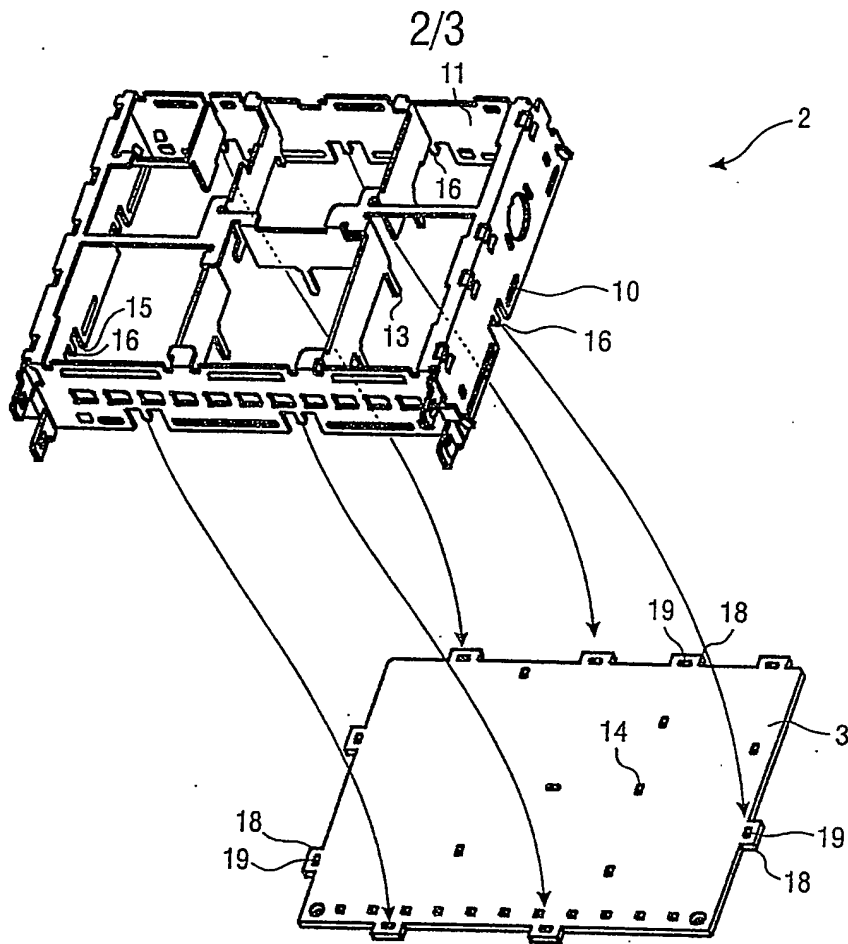


FIG. 1



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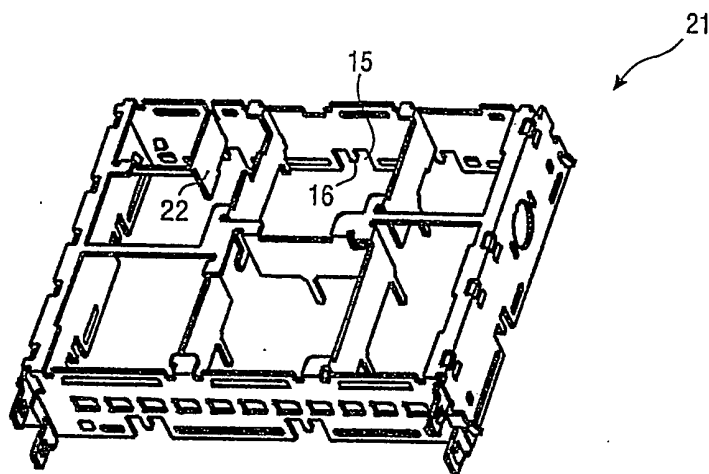


FIG. 4